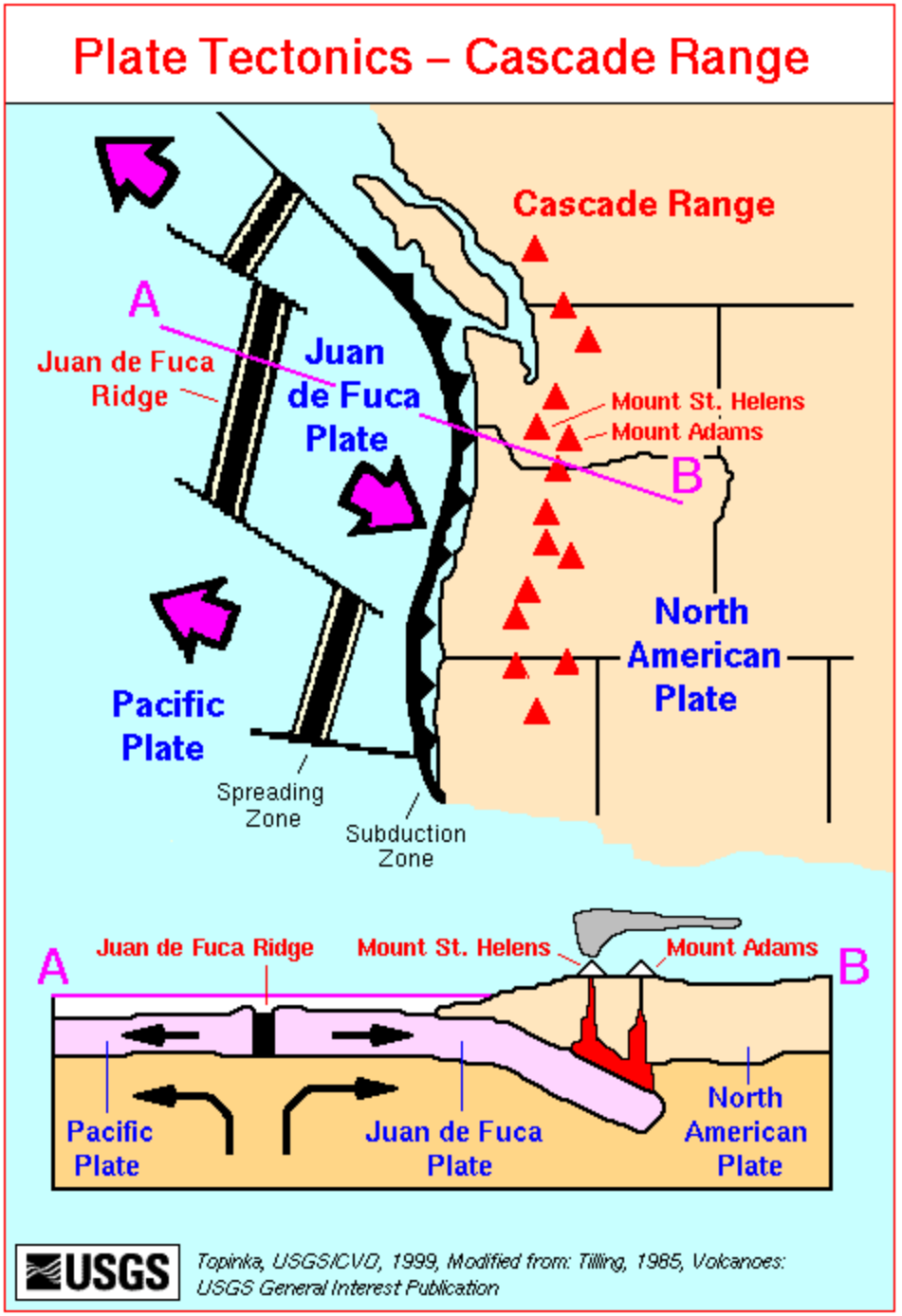
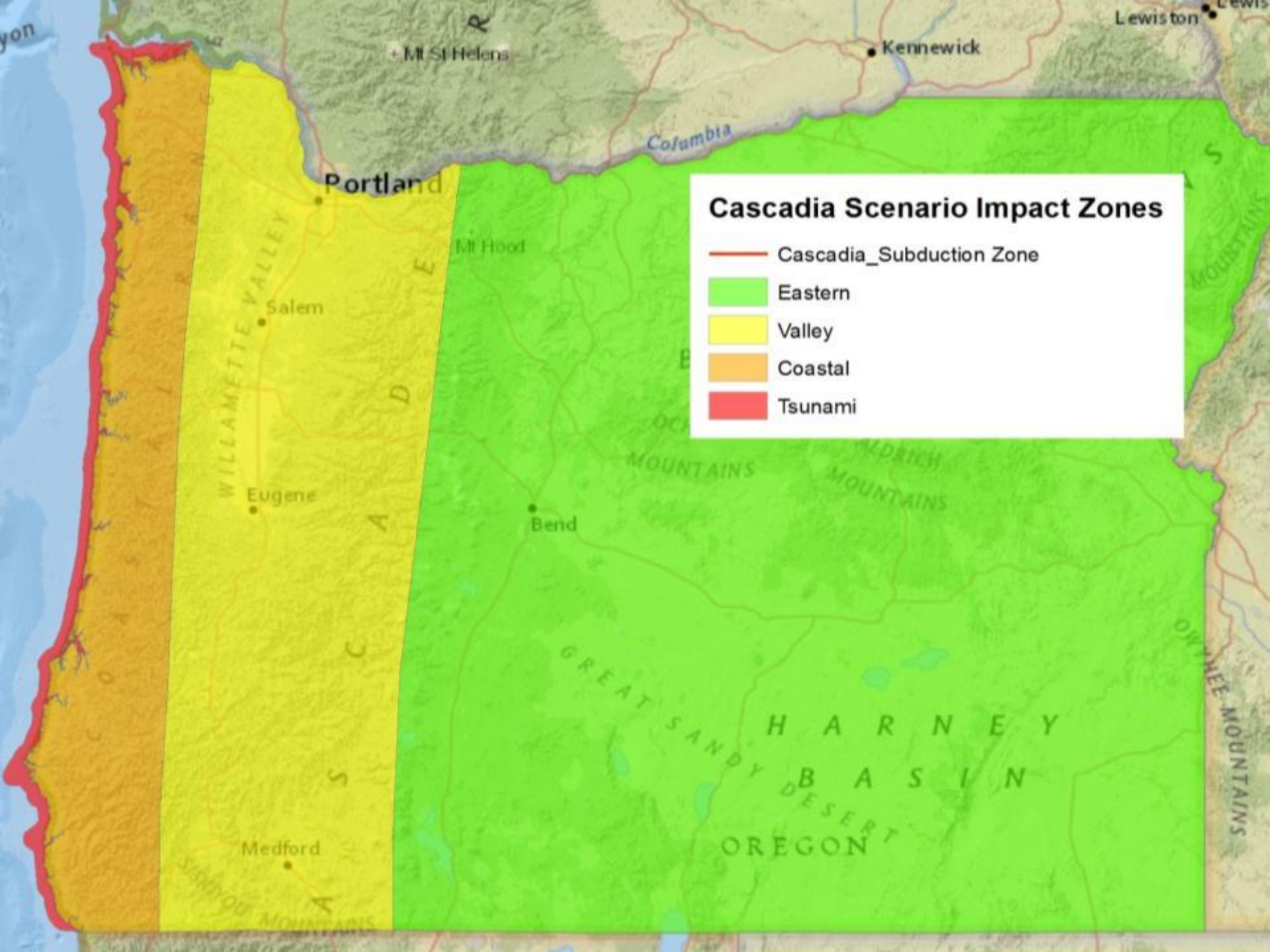
Seismic Readiness of Oregon's Highways

Paul Mather, Highway Division Administrator
Bruce Johnson, State Bridge Engineer
April 4, 2016

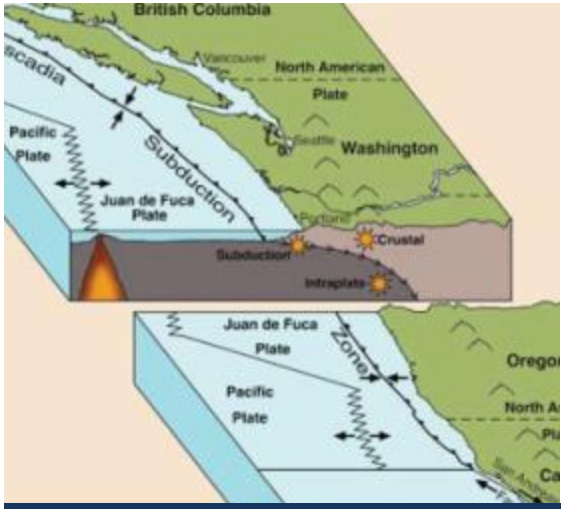
The Cascadia Subduction Zone




Cascadia Scenario Impact Zones
Cascadia_Subduction Zone
Eastern
Valley
Coastal
Tsunami
Portland
Salem
Eugene
Medford
Bend
Mt Hood
Mt St Helens
Kennewick
Lewiston
Columbia
WILLAMETTE VALLEY
CASCADE
COASTAL
MOUNTAINS
GREAT SANDY DESERT
HARNEY
BASIN
OREGON

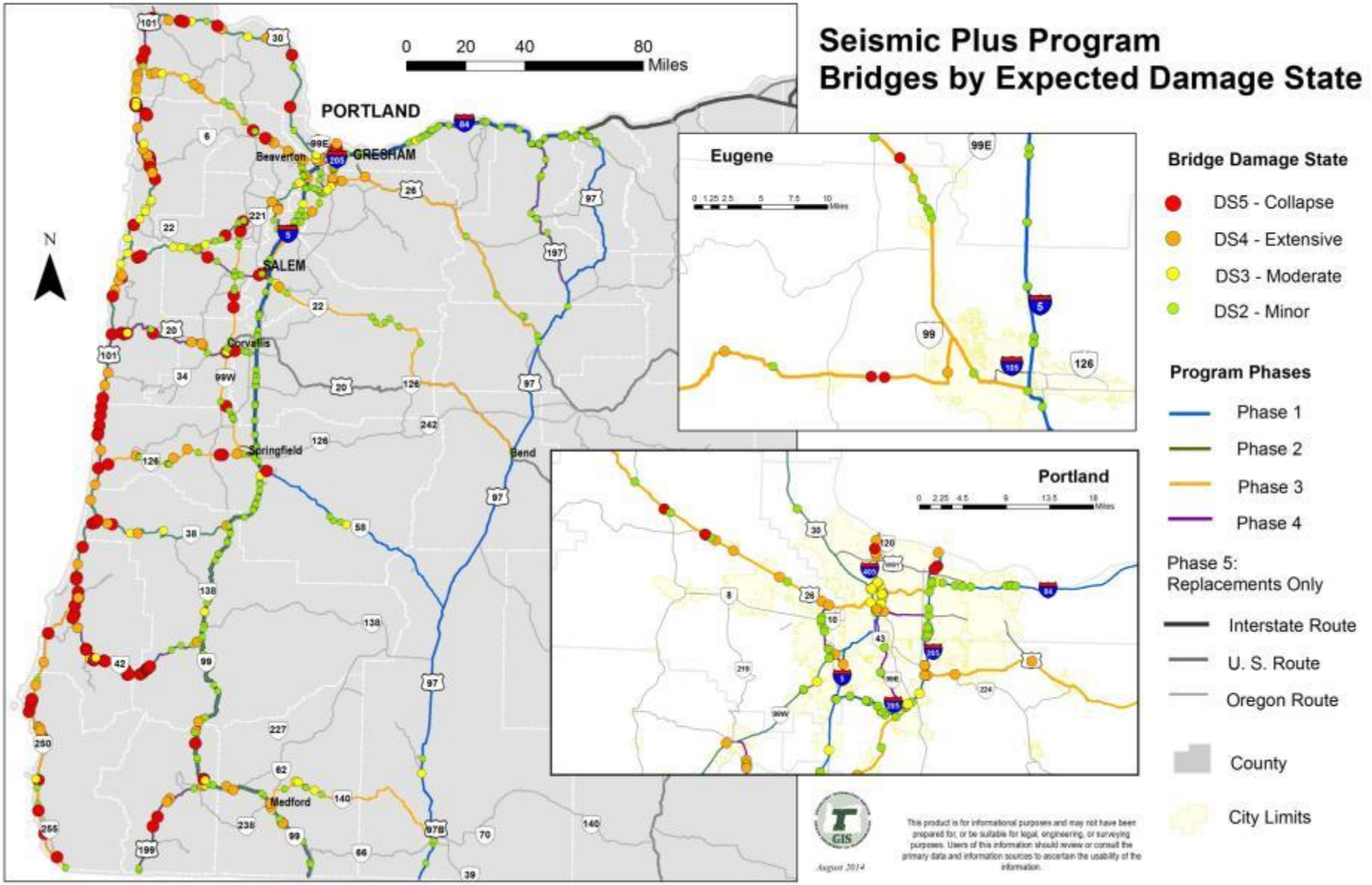
The Oregon Resilience Plan

Required by the legislature, supported by Governor



Comprehensive plan, developing a strategic approach

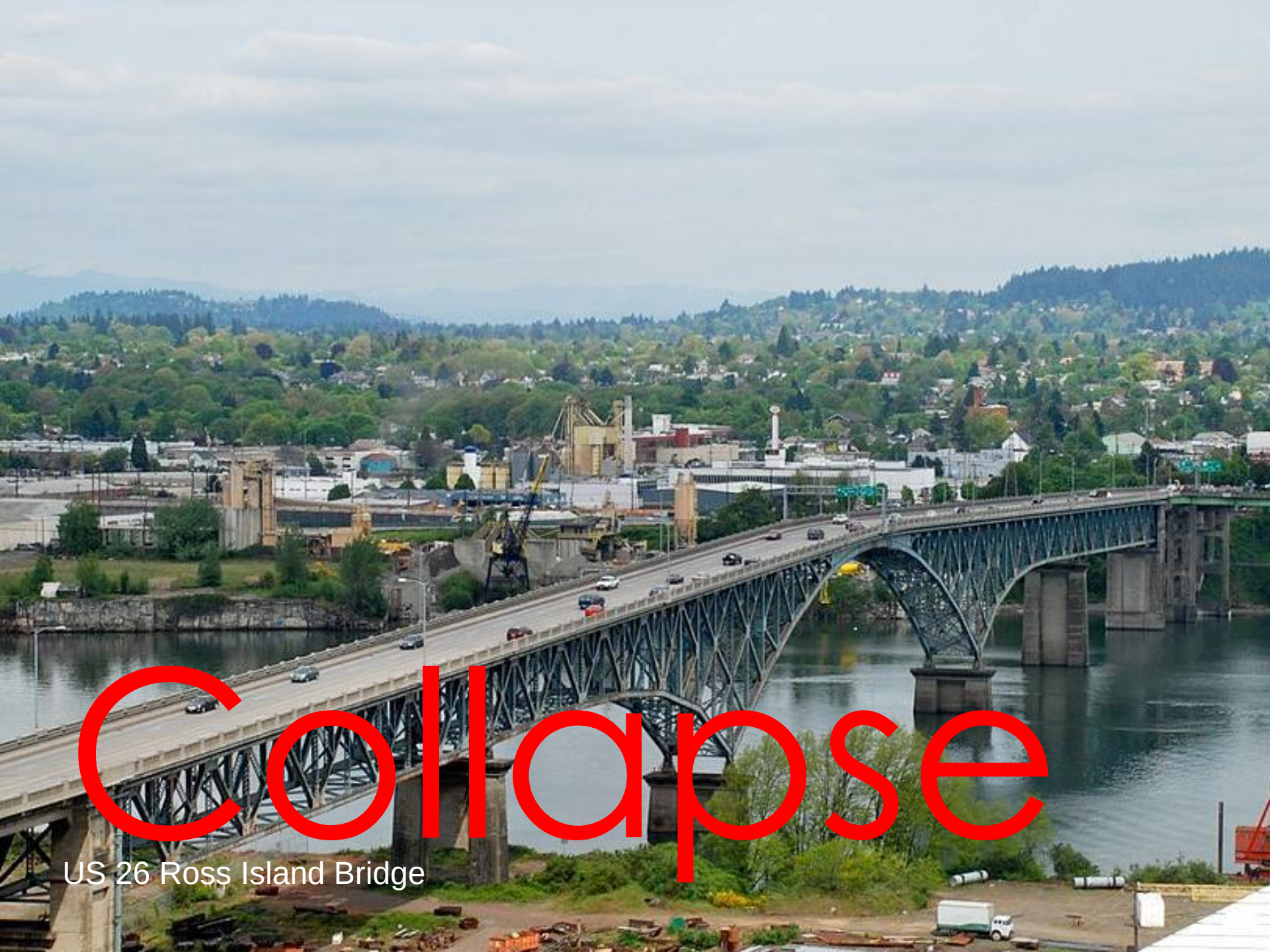
Transportation is critical


Seismic Plus Program
Bridges by Expected Damage State
0 20 40 80 Miles
N
PORTLAND
Beaverton
GRESHAM
SALEM
Corvallis
Springfield
Bend
Medford
Eugene
Portland
Bridge Damage State
DS5 - Collapse
DS4 - Extensive
DS3 - Moderate
DS2 - Minor
Program Phases
Phase 1
Phase 2
Phase 3
Phase 4
Phase 5:
Replacements Only
Interstate Route
U. S. Route
Oregon Route
County
City Limits
GIS
August 2014
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.


Moderate
I-5 Marquam Bridge

Moderate

I-405 Fremont Bridge


Collapse
US 26 Ross Island Bridge


Collapse
Astoria-Megler Bridge


Collapse
I-5 Interstate Bridge


Slight to
Moderate
I-205 Glenn Jackson Bridge

The solution

RETROFIT

For **life safety** to prevent collapse

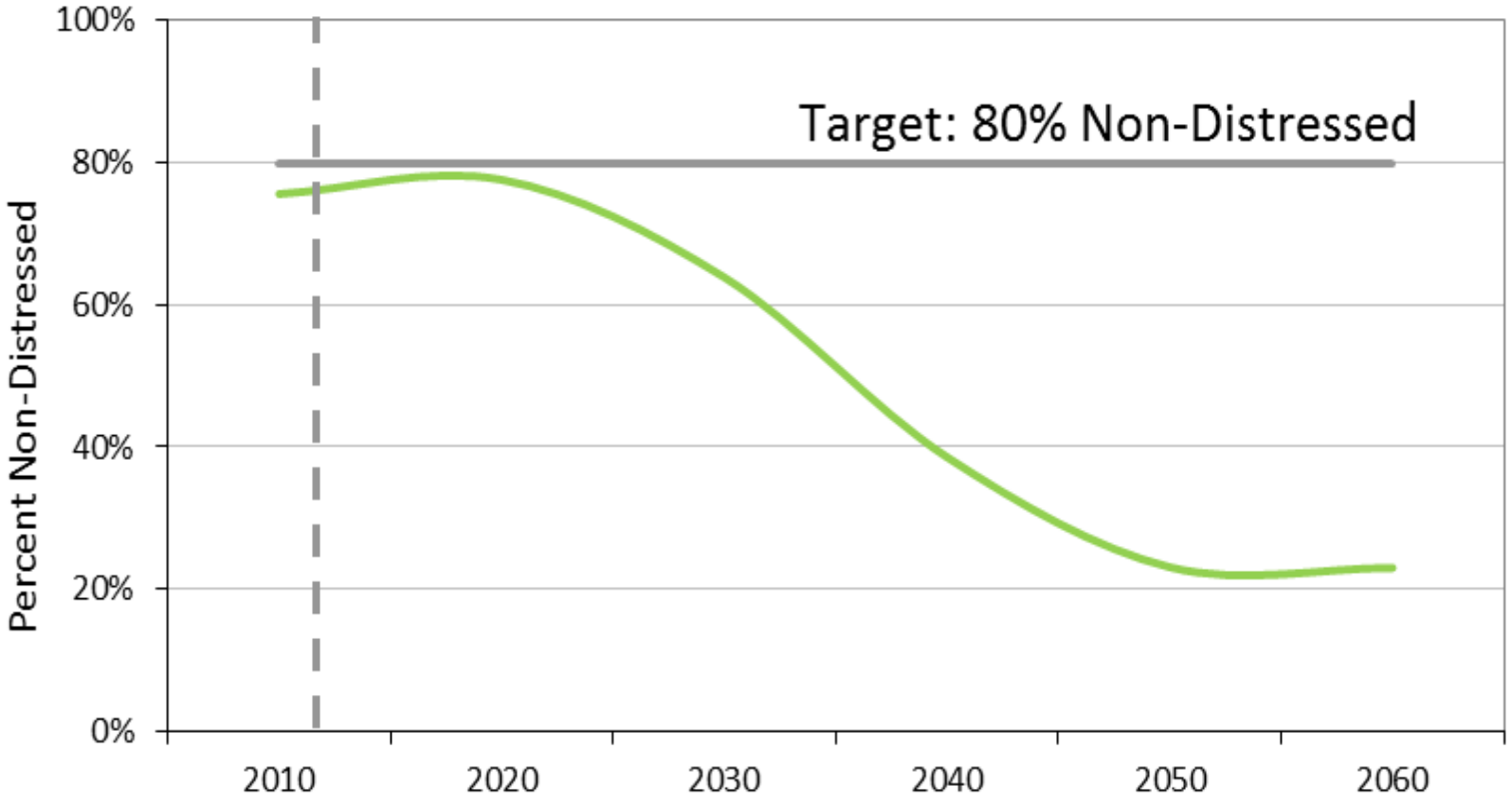
For **serviceability** to keep the bridge functional

Retrofitting progress

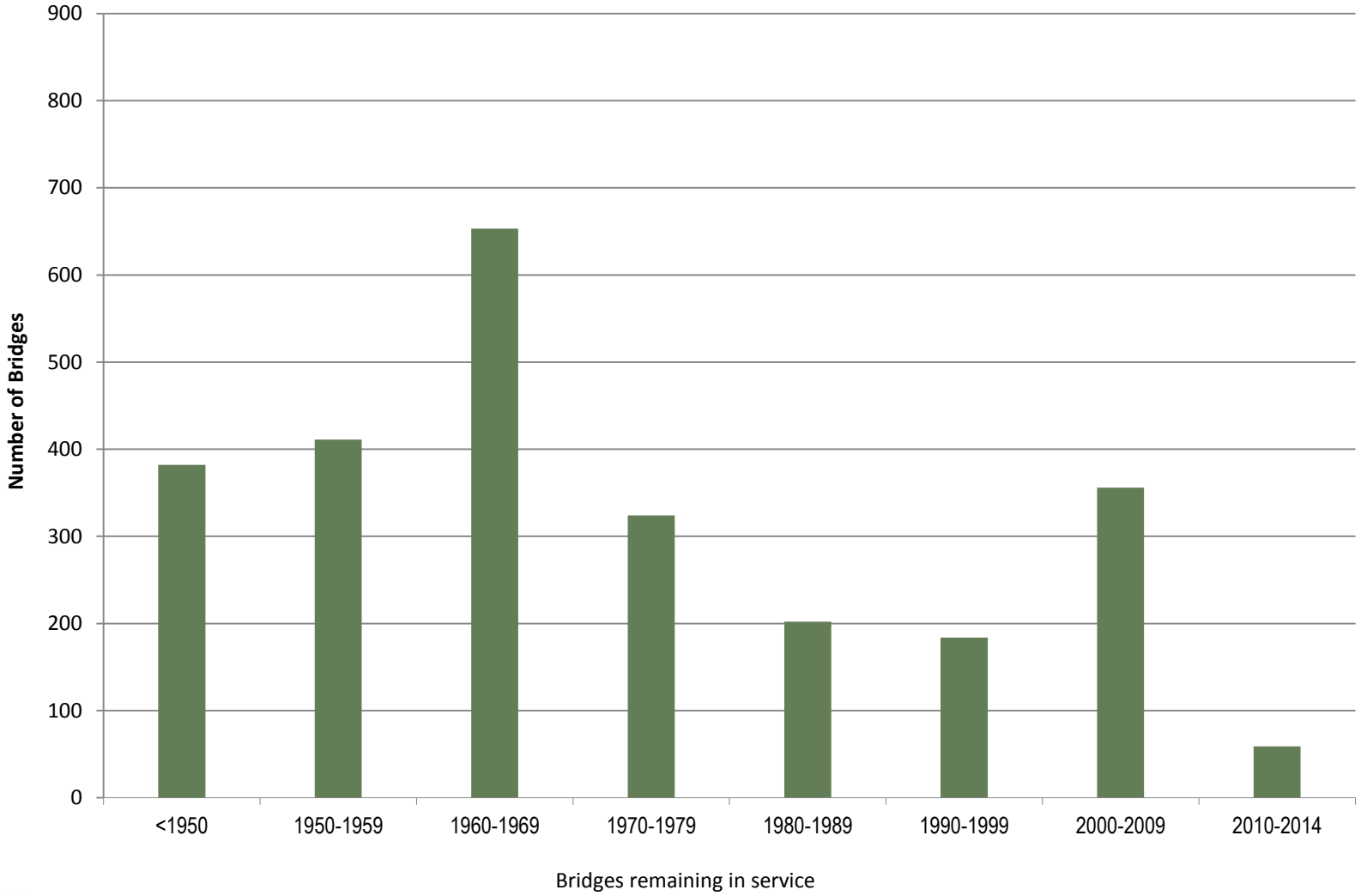
First 16 years since vulnerability was identified

Years	Actions	
1994/1997	Prioritized total bridge needs	1155
1985-2012	Phase 1 retrofit added to projects (STIP & OTIA III program) bridges addressed	355
Future	Bridges still needing retrofitting (About 200 years at current funding)	800

Bridge Conditions Decline



Most bridges beyond design life



- Identify strategic lifeline routes
- Minimize long term economic damage
- Address overall bridge condition

-Oregon Highway Seismic Options Report

Route selection

Survivability	• Emergency responders • Critical care facilities
Life Support	• Critical care facilities • Life support resources • Evacuation routes
Economic Recovery	• Critical freight corridors • Mobility into and out of the region • Routes between large metro areas

SEISMIC PLUS PROGRAM
State Highway Network

LEGEND

- Program Phase 1
- Program Phase 2
- Program Phase 3
- Program Phase 4

Phase 5 (replacements) not shown for clarity

- Interstate
- U.S. Routes
- Oregon Routes
- County
- City Limits

1 in = 39 miles

0 20 40 80 Miles

N

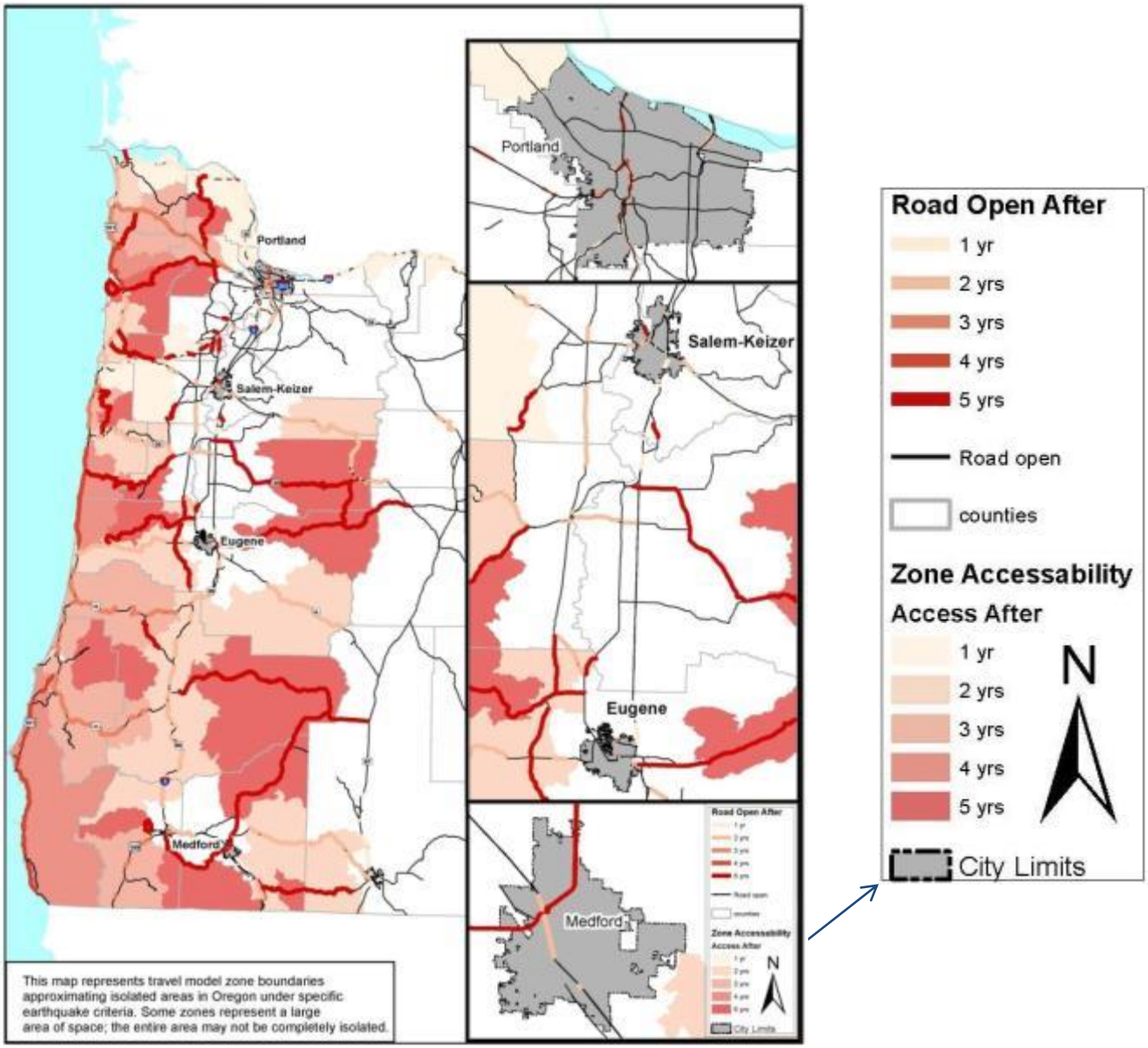
August 2014

Total Seismic PLUS Program Cost

Program Phases	Total Bridge Cost	Landslides/Rockfalls Cost	Total Seismic PLUS Program Costs
1	$738 Million	$197 Million	**$935 Million**
2	$632 Million	$272 Million	**$904 Million**
3	$612 Million	$483 Million	**$1,095 Million**
4	$640 Million	$126 Million	**$766 Million**
5	$1,432 Million	$0	**$1,432 Million**
Total	**$4.1 Billion**	**$1.0 Billion**	**$5.1 Billion**

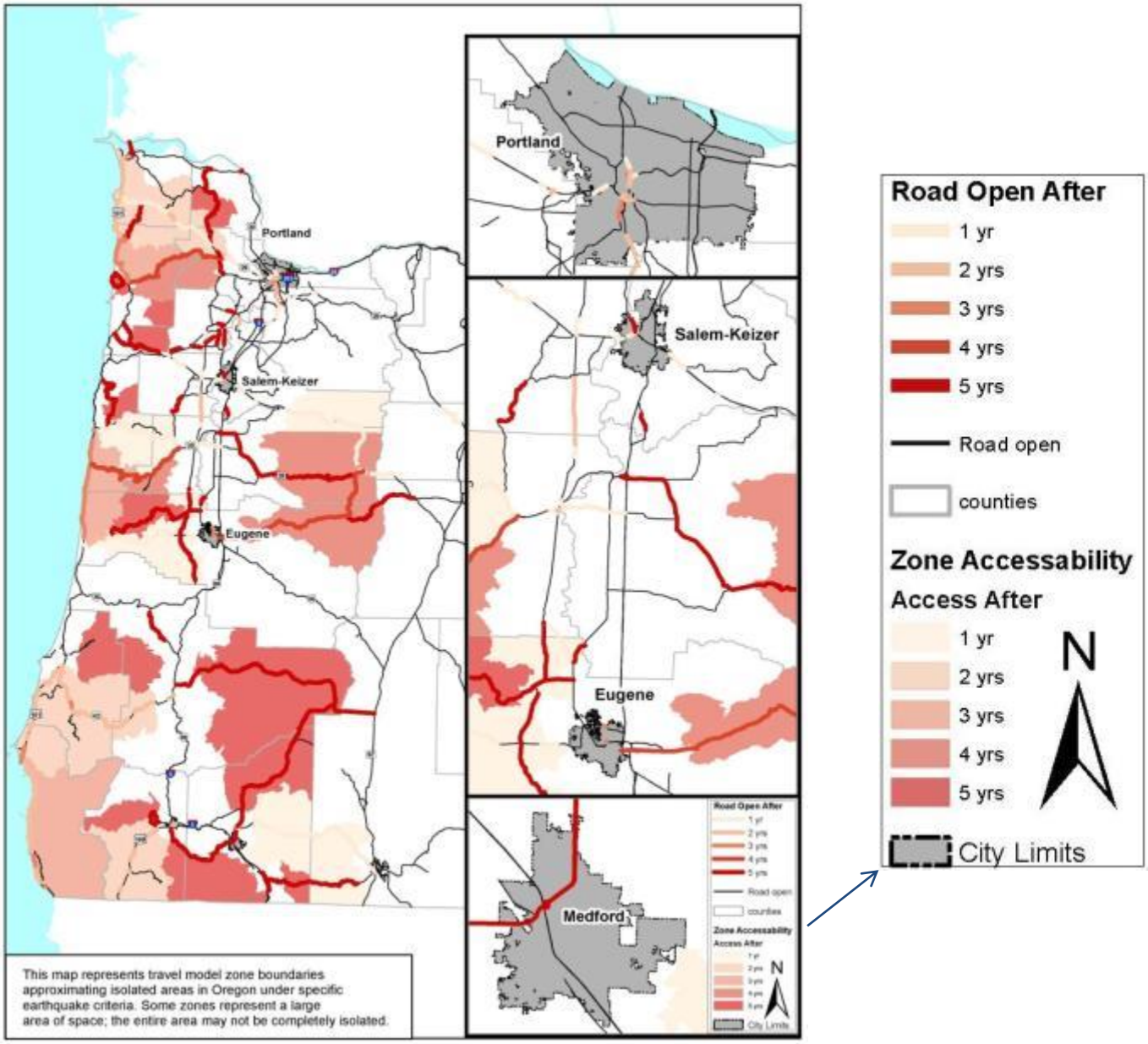
Major Seismic Event: Isolated Areas

Total economic loss: $350 B



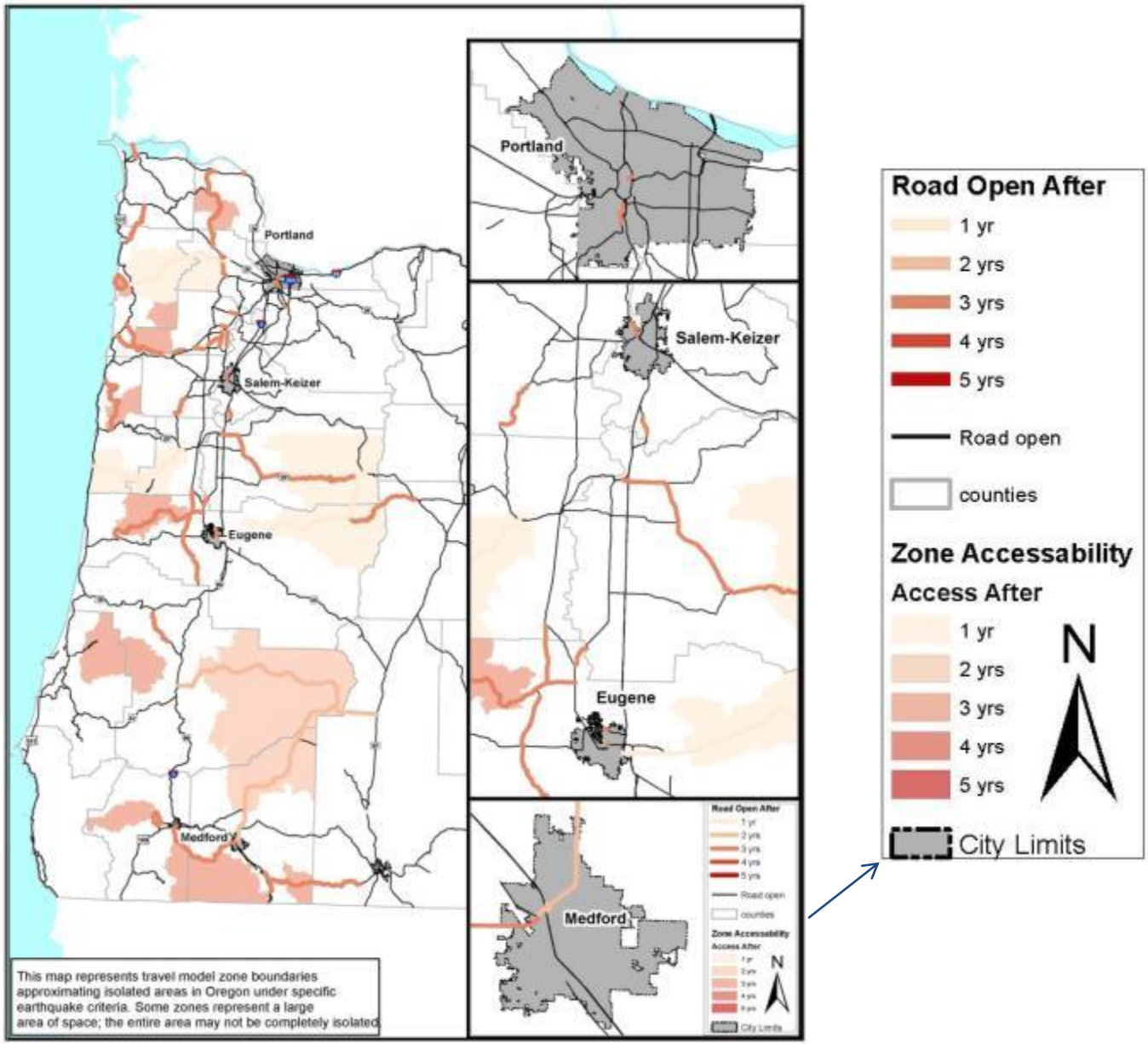
Isolated Zones: Phase 1 & 2 Scenario

Reduce economic loss by:
$35 B



Isolated Zones: Full Seismic Program

Reduce economic loss by:
$84 B



We need to start NOW

Transportation is key to the overall response

Seismic Retrofit by State

5147 Bridges

$13 Billion

416 Bridges

$177 Million

143 Bridges

$44 Million

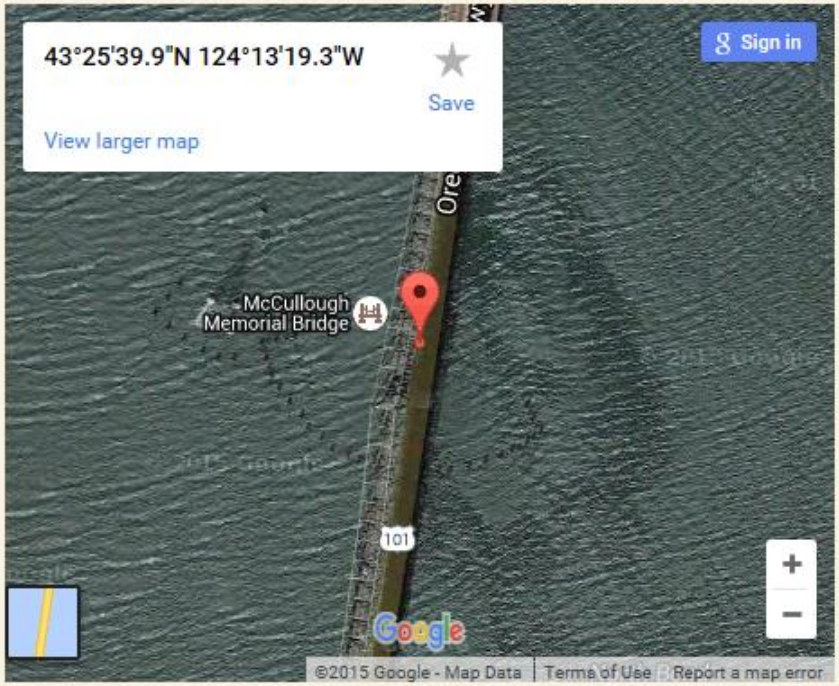
Take Home Learnings… Next Steps

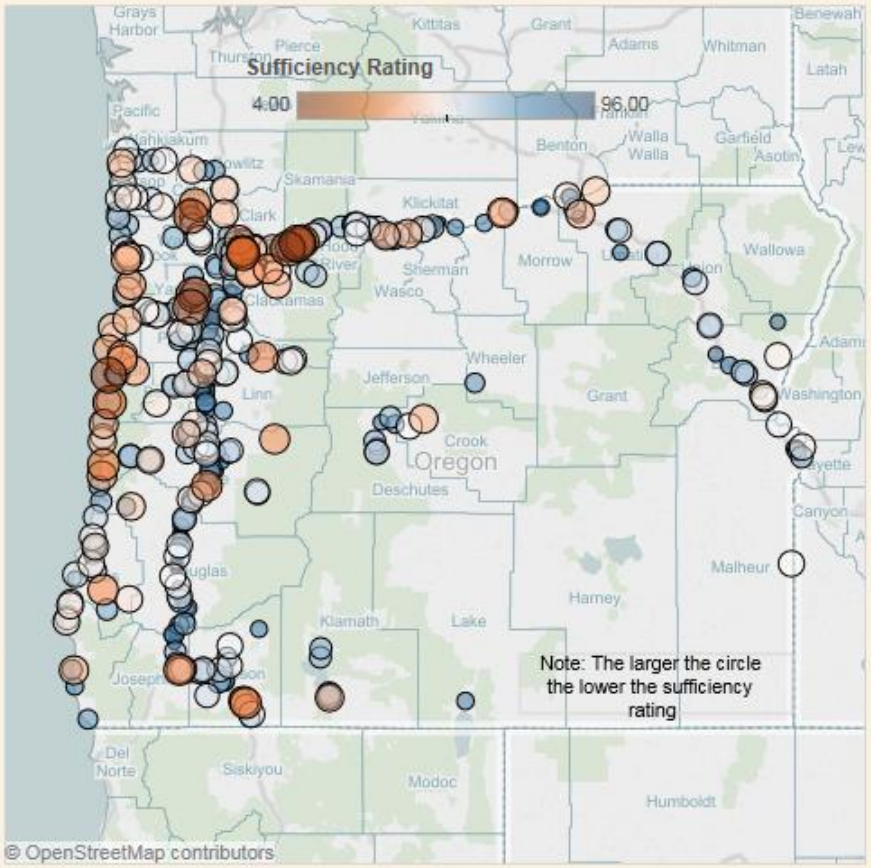
- Engage local communities
- Bridge condition – include seismic
- Bridge funding

Bridges of Oregon

(Filters defaulted ODOT Bridges rated as Functionally Obsolete and/or Structurally Deficient)

Oregon Bridges | Oregon Bridge building and condition | Sufficiency Rating, Funct Structurally Deficient Brid





Filter By:

Status (Multiple values)

Year built 1899 — 2015

Custodian State Highway Agency...

County (All)